REMARKS

The Examiner is thanked for the comments in the Action. They have helped us considerably in understanding the Action and in drafting this Response thereto. It is our understanding that claims 1-14 remain pending in this application.

Preliminary comment:

Respectfully, we think that there has been confusion between stabilizing the frequency of a laser and locking the frequency of a laser. These two characteristics are sometimes informally spoken of as synonymous but they are different. In the present context, frequency stabilization relates to preventing frequency change and frequency locking relates to maintaining a specific frequency. Thus, a system can be quite stable yet wrongly operating at an incorrect frequency, and a system can be quite dynamic about a central frequency yet be operating properly because that central frequency is fixed.

Item 1 (§ 102(b) rejections):

Claims 1-3, 6, 8, and 10-14 are rejected as being anticipated by Brown et al. **The Action here states:**

> *Regarding claim 1, Brown (Fig. 1) discloses a device for stabilizing and locking the frequency of a light beam from light source 10 comprising a first beam splitter 15 to separate a portion of the light as a sample beam, a confocal Fabry-Perot etalon 18 to receive the sample beam and generate a filterization beam, a photodetector 19 to receive this beam. This is then coupled to differential amplifier 21 that provides a signal to a feedback loop that ends at current control 11 to control the output of the laser based on the received signals.* (emphasis added)

Respectfully this is error because Brown merely teaches a device for stabilizing frequency. It does not teach or reasonably suggest locking frequency. Notably, it does not use the word "lock" or any variant of it anywhere.

What Brown teaches for frequency stabilization is also structurally different than the claimed invention. It teaches a two-feedback loop scheme employing a first signal for controlling source laser current and a second signal for controlling source laser temperature. The first signal proceeds through differential amplifier 21, high pass filer 24, and gain adjust 25 to a

current control 11; and the second signal proceeds through differential amplifier 21, low pass filer 24, and gain adjust 28 to a feedback heater 13.

Furthermore, Brown's teaching of its differential amplifier 21 is particularly relevant here. Applicants' claim 1 recites that its "*filterization signal ... is representative of light intensity*" in the beam from its etalon. Brown's scheme based on the difference of two signals cannot be reconciled with this.

Accordingly, Brown has a different purpose than the claimed invention and it teaches different principles of operation to accomplish its different purpose, using an additional signal and considerable additional circuitry.

The Action next states, "*Regarding claim 6, since Brown discloses the claimed apparatus in its entirety, the claimed method of the instant application flows from the use of the Brown apparatus.*" However, as has been shown with respect to claim 1, above, Brown teaches frequency stabilization. It does not teach or reasonably suggest steps to achieve frequency locking.

The Action next states, "*Regarding claim 12, the device disclosed in Figure 1 discloses the use of a confocal etalon 18.*" Applicants agree with this as a statement of fact, but we respectfully submit that it is irrelevant to rejection, since the device disclosed in Figure 1 of Brown is for frequency stabilization rather than frequency locking.

The Action next states, "*As for claims 2, 3, 10, 11, 13, and 14, the confocal Fabry-Perot etalon of Brown includes 'any interferometer which includes a pair of spaced, flat or curved, parallel mirrors so that interference fringes are produced by multiple reflection of light between the mirrors' (Col. 3, lines 20-25).*" That Brown includes this is correct, but we cannot agree that this reads on any of Applicants' claims. No art has been cited as teaching or reasonably suggesting the use of a confocal etalon for frequency locking. Additionally, we urge that these claims are allowable for at least the same reasons noted above for their parent claims 1, 6 and 12.

And the Action next states, "*As for claim 8, Brown discloses current control 11.*" Yes, Brown discloses such – but claim 8 nowhere recites such. Granted, changing current is one of many possible ways to affect laser frequency, but such alone is no guarantee that the laser frequency will be stable or locked. For example, even Brown teaches that both current and temperature must be controlled in its frequency stabilization scheme.

In particular, however, this serves to illustrate a difference between frequency stabilization and frequency locking. Here the claimed invention is not only suitable for locking to a specific frequency – it is also suitable for tuning to that specific frequency or for tunably changing to another specific frequency.

Additionally, we submit that claim 8 is allowable for at least the same reasons noted above for its parent claims 6.

Item 2 (§ 103(a) rejections):

Claims 4-5, 7, and 9 are rejected as being unpatentable (obvious) over Brown et al. **The Action here states:**

> *As for claim 4, Brown fails to explicitly disclose the use of a system link and a processor. However, Brown discloses the use of a differential amplifier 21, high pass filter 24, and a gain adjustment element 25 to process the signal for current control 11 in an equivalent manner to a stand alone processor, while a system link between the elements is inherent to the device. Therefore, because the combined elements of Brown perform an equivalent function to a stand alone processor with a system link, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute a processor for the multiple elements of Brown.* (emphasis added)

Respectfully this is error. As discussed above, Brown teaches a system for frequency stabilization while the claimed invention performs frequency locking, and these are different. As also discussed, Brown's particular teaching of the use of a differential amplifier 21 cannot be reconciled with the claimed invention (neither claim 1 discussed above, or with its dependent claim 4 here). Notably, merely elements 21, 24, 25, and 11 of Brown (those being cited) are not even enough to perform the purpose of Brown, since its teaching also requires at least its elements 27, 28, and 13 to accomplish its frequency stabilization. The claimed invention does not require these elements to accomplish its different purpose of frequency locking. In sum, we respectfully submit that the actual totality of the combined elements of Brown do not perform an equivalent function to the claimed invention.

The Action next states, "*As for claim 5, Brown discloses a single beam splitter 15 that splits off a normalization beam from the input beam, and a normalization photodetector 20 that passes its signal on to differential amplifier 21.*" However, the rationale here may be based on Applicants' specification and 20/20 hindsight, since Brown does not use the words "normal" or "normalize" or any variants of these anywhere. Alternately, if normalization is viewed as

contributing to stabilization, that still overlooks that normalization can permit the claimed invention to both lock and stabilize or to perform better locking. In any case, the characterization here of Brown teaching or suggesting normalization for any specific purpose is not supported in the Action.

Continuing, the Action states:

> *Brown fails to disclose, however, a second beam splitter, links between elements, and a processor.* [But] *Brown does disclose a single beamsplitter 15 that serves to split the incoming beam into a measurement and reference beam. It would have been obvious to one having ordinary skill in the art at the time the invention was made to add a second beamsplitter to the device to perform the operation of a single beamsplitter, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.*

Although not really relevant to the substance of the rejection, this merits clarification for the record. Brown's teaching of a system having a single beamsplitter 15 is somewhat illogical if one considers that stabilizing the frequency of a laser beam is pointless if such has no utility. With reference to our FIG. 3, for example, Applicants' first beam splitter 108 receives a light beam 104, splits out a sample beam 110 from that, and passes the rest of the light beam 104 to a process 106 (wherein lies utility). Applicants' second beam splitter 112 then receives the sample beam 110, splits out a normalization beam 114 from that, and passes the rest of the sample beam 110 to an etalon 116 to filter it into a filterization beam 118.

Continuing further, the Action states:

> *As for the links and the processor, Brown discloses the use of a differential amplifier 21, high pass filter 24, and a gain adjustment element 25 to process the signal for current control 11 in an equivalent manner to a stand alone processor, while a system link between the elements is inherent to the device. Therefore, because the combined elements of Brown perform an equivalent function to a stand alone processor with a system link, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute a processor for the multiple elements of Brown.*

However, the second feedback loop of Brown is apparently overlooked here again. The Actions does not state, and it would seemingly be clear that this is not for normalization in any manner that applies to claim 5. Accordingly, Brown's use of two feedback loops, one for current control and the other for temperature control, and all of the extra circuitry that this entails (e.g., elements 27, 28, and 13) amount to considerably more than required by the claimed invention to achieve its (different) purpose. Also, as already discussed at length herein, the differential

amplifier 21 of Brown cannot be reconciled with the claimed invention. In sum, and particularly as all of this relates to the lack of obviousness, the respective inventions employ different principles of operation.

And the Action next states, "*As for claims 7 and 9, since Brown discloses the claimed apparatus with its obvious modifications as discussed above with regard to claims 4 and 5, the claimed method of the instant application flows from the use of the modified Brown apparatus.*" However, as we have shown above, Brown does not disclose what it has been relied upon as disclosing. Additionally, since the rationale for rejection here relies upon modification of Brown, this begs the question: What is the motivation to modify Brown in this manner? The Action fails to state any such motivation appearing in the cited references or that would be known to one of ordinary skill in the art. If Brown contains such a motivation, we respectfully call upon the Examiner to cite to it so that Applicants are given a reasonable opportunity to reply. Alternately, if the Examiner is taking official notice that such a motivation is known to those of ordinary skill in the art, we call upon the Examiner clearly state this and to cite at least one example of art in support of such.

CONCLUSION

Applicants have endeavored to put this case into complete condition for allowance. It is thought that the §102 rejections are shown to be unfounded on the prior art references cited and that the §103 rejections have been completely rebutted. Applicants therefore ask that all objections and rejections now be withdrawn and that allowance of all claims presently in the case be granted.

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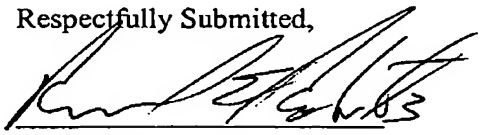
Respectfully Submitted,



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